SEIKO TV WATCH

Seiko, world leader in technology, introduces the world's first TV watch.

TELEVISION

- Liquid Crystal Video Display (LVD) creates a visual image through the molecular arrangement of liquid crystals within an electrified field.
- Receiver changeover switch selects VHF or UHF TV or FM stereo radio broadcasts.
- Volume and brightness controls.
- Compact, lightweight receiver.
- Comfortable, adjustable headphones. Headphones cord serves as antenna.
- Receiver operates approximately 5 hours on two alkaline "AA" batteries.
- Optional AC adapter.

WATCH

- Displays hours in 12 or 24-hour readout, minutes, seconds, day and date.
- Alarm rings daily at preset AM or PM time and can be set for hourly time signals, if desired.
- Battery life of approximately two years; battery life indicator.

CHRONOGRAPH

- Measures elapsed or split time in hours, minutes, seconds and 1/100 seconds up to 12 hours.

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SEIKO
TV WATCH
Q&A

Q. 1 - What sort of TV reception can I expect?

A. - The Seiko TV Watch has about the same reception capabilities of other portable televisions, but the quality of TV electrical waves deteriorates in places which are blocked by high buildings, mountains or the like - even if your receiver is in good working order. You also won't get reception in underground walkways, subways, etc. where electrical waves do not reach.

Q. 2 - Do you need an antenna for television reception?

A. - The headphones cord serves as an antenna. Extend the cord as much as possible to enjoy the best reception. Avoid crumpling and folding the cord together.

Q. 3 - Can you hook it up to an outside antenna?

A. - If you connect a 300 ohm flat ribbon twin lead wire to the lead-in terminal of an outside antenna and wrap the wire around the headphones cord or run it parallel to the cord, you can receive the TV signal pulled in by an outside antenna. However, the length of the cord should be 10 feet or less.

Q. 4 - Will you get reception on a train or in a car?

A. - Yes. You might lose the signal or it might get flutter when you pass through a tunnel, between high buildings, or close to a mountain.

Q. 5 - Can you use it when you go overseas?

A. - Since broadcasting systems and frequency range differ from country to country, generally speaking you will not be able to use the TV and FM receivers of your domestic model when you go abroad. You will be able to get reception in countries which use the same braodcasting system and are within the same frequency range as the U.S.

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Q. 6 - How is liquid crystal TV different from a regular Cathode ray-tube TV?

A. - The traditional Cathode ray tube shoots electrons from an electron gun behind the display screen and illuminates flourescent paint on the screen. It requires high electrical voltage and lengthy size. In contrast to this liquid crystal TV controls the molecular arrangement of liquid crystal within an electrical field to create an image. This makes possible miniature size and low power consumption.

Q. 7 - How much light is required for the TV image to be visible?

A. - LVD creates a screen image by reflecting the surrounding light. Consequently, the image becomes difficult to see in dark places. Conversely, extremely bright places such as sunny beaches, which tend to wash out traditional Cathode ray tube, enhance the contrast of the LVD picture. You will not get an image in a pitch black room, but you will get an image in any place where it's bright enough to read a book.

Q. 8 - Why doesn't time display appear on the TV screen?

A. - LVD changes sixty times in a single second during the approximately 32,000 screen dots of information it transmits. Since handling such a large quantity of information requires a large amount of power a large battery becomes necessary which cannot be incorporated within the watch. For this reason, the TV Watch has a separate time display panel and separate battery power. An advantage of having such a independent panel is that you can tell what time it is whether or not you're using the TV.

Q. 9 - Is something as small as a baseball visible on the screen?

A. - Yes, it is.

Q. 10 - Can you read numbers and letters on the screen?

A. - Just like when you watch a color broadcast on a black and white TV, there will be times when numbers and letters are difficult to see because of the background color, but you should be able to make them out if they are sufficiently large enough.

Q. 11 - Can you regulate screen brightness?

A. - Yes, by turning the brightness knob behind the receiver.

Q. 12 - What does "LVD" mean?

A. - This is an abbreviation for Liquid Crystal Video Display, a unique development by SEIKO. LVD is capable of displaying a great quantity of information. "Guest" and "Host" liquid crystals are enclosed between glass and silicone base made with transistors to create each of the 31,920 screen dots which make up the picture.

Q. 13 - Why is the screen image blue?

A. - This is because there is blue in the liquid crystals. Different varieties of color can be used in liquid crystals, but for such purposes as contrast durability, shades of blue are generally best. Also, it is a color which is relatively easy to distinquish.

Q. 14 - What are screen dots?

A. - When you magnify a newspaper photograph you see that it is made up of innumerable small dots. In the same way, a TV image can be divided into a grid pattern which is also made up of many small dots.

Q. 15 - Can you listen to the TV sound without the picture?

A. - Yes - by moving the video switch to the "OFF" position or by unplugging the video connector.

Q. 16 - What is the weight of the TV Watch compared to other watches?

A. - The watch is about the same weight and size as a Seiko Diver's watch. The Power Pack-Tuner is slightly lighter in weight than the leading Personal FM Radio.

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Q. 17 - How is an LVD panel different from a digital watch panel?

A. - In a digital watch panel, both the upper and lower bases are made of glass, but in the case of the LVD, the lower base forms an integrated circuit in order to create a switching transistor for each screen dot. This activates each dot with static drive and greatly increases display capacity. This is the heart of LVD.

The liquid crystals are another difference. A twisted Nematic (TN) Mode is used in a digital watch and a guest-host mode is used in LVD. In the TN mode, both the upper and lower bases employ polarized light, but in LVD since the lower base is made of non-transparaent silicon, the lower portion cannot use polarized light. LVD adopts a guest-host mode which requires only one polarized light base. In addition, an advantage of the guest-host mode is that it provides a wide angle of clear vision since it has only one polarized light base.

Q. 18 - What are guest-host liquid crystals?

A. This refers to the dichromatic pigments (the guests) which are mingled with the nematic crystals (the hosts) which are used in digital watches. "Dichromatic pigments" indicates that the color molecules along the long axis and the short axis have different rates for absorbing straight line polarized light.

When electrical pressure is not being applied, the liquid crystal molecules and the color molecules are lined up parallel to the LVD base and straight line polarized light running parallel to the long axis of the color molecules is absorbed by them and appears blue.

When electrical pressure is being applied, the liquid crystal molecules stand up perpendicular to the LVD base and at the same time the color molecules also stand up straight. Since the direct line polarized light is perpendicular to the long axis of the color molecules, it is not absorbed by them and appears white.

Q. 19 - Can you use the TV Watch to display video tapes?

A. - In the same way that you hook it up to an outside antenna, you can display a video tape image by connecting a twin lead wire to a video machine's output terminal and wrapping the wire around the headphones cord. It can be used for such purposes as checking the image of a video camera in outdoor operation or for showing video tapes at a retail display counter.

Q. 20 - Can you use it for personal computer output?

A. - Theoretically, there are personal computers with which you could use it, but since the screen is small and is not equipped with a terminal connection, this would not appear to be a practical possibility.

Q. 21 - It has a stereo/mono switch, but when would you use the mono switch?

A. - If you switch from a stereo to mono in places where the FM signal is weak or there is a lot of static noise, the sound quality will improve. However, when you do so, reception becomes monaural and the stereo indicator light goes out.

Q. 22 - Does it receive AM broadcasts?

A. - The TV Watch does not have an AM receiving function.

Q. 23 - Can you use headphones and earphones not specifically made for the TV Watch?

A. - You an use any stereo headphones equipped with a mini-jack as long as the jack fits the converter plug that comes with the TV Watch.

Q. 24 - How do you control the band size of the headphones?

A. - The size is controlled by rotating the speakers on the headset.

Q. 25 - Is it waterproof?

A. - The wrist TV element will keep out perspiration and dust, but it is not waterproof. You should take as much care with the receiver as you would for any electrical product.

Q. 26 - Will any problem result from pulling the plug while you are receiving?

A. - Nothing will happen, but you should use the proper operating procedure which is to pull the plug only after you have cut off the power.

Q. 27 - When the television display batteries die what happens to the time display?

A. - Since the batteries for the TV display and time display are separate, dead TV batteries will not effect the time display.

Q. 28 - Is it adversely effected by static electricity?

A. - There is a lot of static electricity generated during dry winter weather, ranging at times from several thousand to several tens of thousands of volts. The TV Watch has been designed to resist static electricity to the greatest extent possible. For safety's sake, you should avoid getting it near areas where there is a great deal of it.

Q. 29 - Will anything happen if you get it near other household electrical applicances?

A. - Generally speaking, nothing will happen.

Q. 30 - Do you shorten the battery life by turning the sound up loud?

A. You will shorten the battery life slightly by turning the sound up loud.

Q. 31 - Is it alright if it gets exposed to sea breezes?

A. - There will be no problem resulting from simple contact with sea breezes, but you should wipe it with a soft cloth if it comes in contact with salt water.

Q. 32 - Can you wear it walking in the rain?

A. - Since the TV Watch is perspiration resistant, no harm will come if you wipe if off immediately after it has been exposed to a light rain.

Q. 33 - Is the video connector safe from contact with water?

A. - Take care that no water gets on the video connector. If water does get on the video connector, wipe it off right away with a dry cloth.

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Q. 34 - Can you tell when the batteries are giving out?

A. - Yes, Time display: You will be warned by the flashing of the data displayed in the time mode (hour, minute, second, day, date).

TV display: The TV image will get easily scrambled and dark, or the sound will get distorted and hard to listen to with lots of noise. There will also be cases in which a blue line appears on the right edge of the screen.

Q. 35 - Can you change the batteries by yourself?

A. - The power source for the TV display is in the receiver. You can change the batteries by yourself (uses two size AA dry batteries). The time display power source is in the wrist TV element, which you cannot change by yourself. It can be changed by any authorized Seiko dealer.

Q. 36 - Where should you leave it when you aren't using it?

A. - Do not leave it in a spot where there is a lot of moisture or dust. In order to preserve the TV display-panel, do not expose it for a long time to the direct sunlight of mid-summer or place it near hot utensils or high temperatures. In addition, if you aren't going to use it for at least a month, remove the batteries from the receiver.

Q. 37 - What kind of maintenance should the user provide?

A. - It does not require special handling. Treat it the same way you would a normal watch with the following points in mind:

Wrist TV: Wipe the surface of the specially treated cover glass with a soft cloth.

Video Connector: Avoid pushing the connector to hard as this can change its shape.

Receiver: Do not let water get into the receiver. Wipe off dirt with a slightly moist cloth from which the water has been thoroughly wrung out.

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Q. 38 - Is the TV Watch capable of receiving simultaneous bi-lingual broadcasts?

A. - This is technologically possible but is not presently included among its functions.

Q. 39 - Can Seiko make a color model?

A. - We are presently investigating various methods.

Q. 40 - Will you be making a lighter model?

A. - The component circuits are extremely compact. We have developed and built in miniature parts throughout from the tuner on down. Presently in 1983 it is the world's lightest TV. We will continue every effort to make it lighter and smaller.

Q. 41 - Can you make it with a larger screen?

A. - Yes. The present model is 1.2 inches, but it would be technologically possible to make one of around 3 inches. However, we believe that 1.2 inches is the most appropriate size for a TV watch.

Q. 42 - Can you project the sound out from a speaker?

A. - You can project the sound out from a speaker if the speaker has high internal resistance (16 ohms or more) and you can connect it to the headphone jack terminal. You will not be able to get adequate sound from a speaker with 8 ohms or less.

Q. 43 - Can you charge it with electricity?

A. - Since the TV Watch is not equipped with chargeable circuitry, you cannot.

Q. 44 - Can you use rechargeable batteries?

A. - Yes. However, since rechargeable batteries, which are nickel

Q. 45 (continued)

A. - cadmium, have a 1.2 V in them when fully charged and are slightly lower in voltage compared to the normal alkaline or alkaline manganese batteries (1.5 V), your continuous listening and viewing time will be shorter.

Q. 45 - Can you consolidate the receiver and the wrist TV in a single case?

A. - With present technology, it is not possible to put them together in a watch, but it is possible to unite them in pocket-size style.

Q. 46 - Is there an auto tuning function?

A. - This is not built into the present model, but Seiko will continue to research it.

Q. 47 - Did Seiko work with another manufacturer to produce the technology for the TV Watch?

A. - No. In particular, Liquid Crystal Video Display is Seiko's unique development.

Q. 48 - How many associated patent appalications does Seiko have?

A. - Basic patents - 10 (display screen, drive system, liquid crystal materials, basic structure, etc.)

Associated patents - 150

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